25. Data Handling-III (Pictorial Representation of Data as Pie Charts

Exercise 25.1

1. Question

The number of hours, spent by a school boy on different activities in a working day, is given below :

Activities:	Sleep	School	Home	Play	Others	Total
Number of hours	8	7	4	2	3	24

Present the information in the form of a pie-chart.

Answer

Here, total number of hours = 24

So,

The central angle = $\frac{Component\ value}{24} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Activity	Number of hours	Sector angle (degree)
Sleep	8	8/24 × 360 = 120°
School	7	7/24 × 360 = 105°
Home	4	4/24 × 360 = 60°
Play	2	2/24 × 360 = 30°
Others	3	3/24 × 360 = 45°

Steps for construction of representation of data in pie chart

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2. Question

Employees of a company have been categorized according to their religions as given below :

Religions	Hindu	Muslim	Sikh	Christian	Total
No. of workers	320	300	225	105	1050

Answer

Here, total number of employees = 1050

So,

The central angle = $\frac{Component\ value}{1080}$ × 360°

Hence, the central angle for each activity will be calculated as follows

Religion	Number of workers	Sector angle (degree)
Hindu	420	420/1050 × 360 = 144
Muslim	300	300/1050 × 360 = 102.9
Sikh	225	225/1050 × 360 = 77.14
Christian	105	105/1050 × 360 = 36

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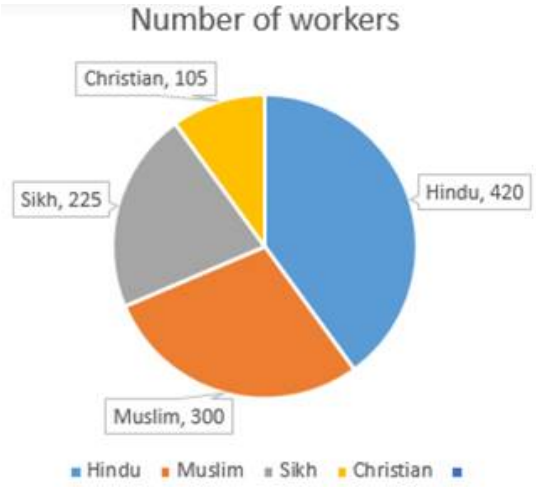

3. Question

In one day the sales (in rupees) of different items of a baker's shop are given below :

Items	Ordinary Bread	Fruit Bread	Cake & Pastries	Biscuits	Others	Total
Amount (Rs.)	260	40	100	60	20	480

Draw a pie chart representing the above data:

Answer

Here, total sales = 480 rupees

So,

The central angle = $\frac{Component\ value}{480} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Sale (in Rs)	Sector angle (degree)
Ordinary bread	260	260/480 × 360 = 195
Fruit bread	40	40/480 × 360 = 30
Cakes and pastries	100	100/480 × 360 = 75
Biscuits	60	60/480 × 360 = 45
Others	20	20/480 × 360 = 15

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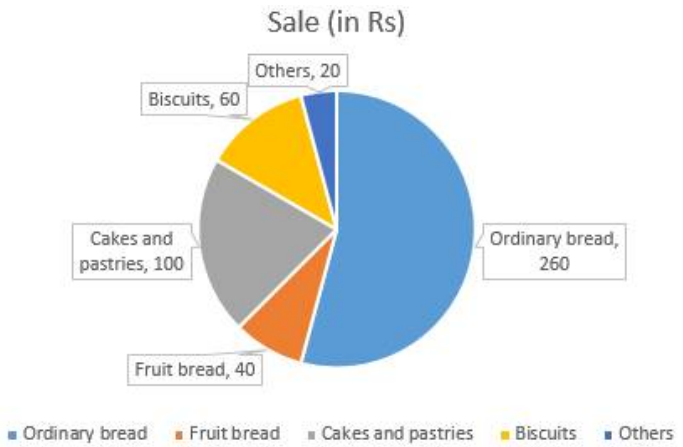

4. Question

The following data shows the expenditure of a person on different items during a month. Represent the data by a pie-chart.

Items of Expenditure	Rent	Education	Food	Clothing	Others
Amount (in Rs.)	2700	1800	2400	1500	2400

Answer

Here, total amount = 10800 rupees

So,

The central angle = $\frac{Component\ value}{10800} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Amount (in Rs)	Sector angle (degree)
Rent	2700	2700/10800 × 360 = 90
Education	1800	1800/10800 × 360 = 60
Food	2400	2400/10800 × 360 = 80
Clothing	1500	1500/10800 × 360 = 50
Others	2400	2400/10800 × 360 = 80

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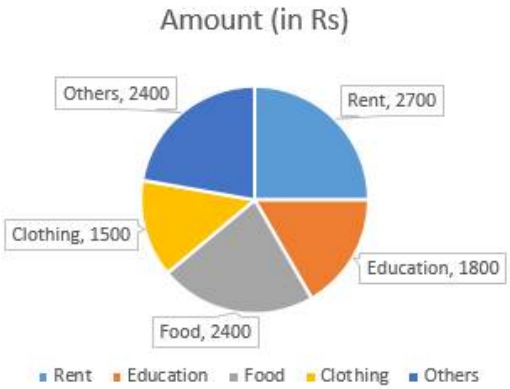

5. Question

The percentages of various categories of workers in a state are given in the following table.

Categories	Cultivators	Agricultural Labourers	Industrial Workers	Commercial Workers	Others
% of workers	40	25	12.5	10	12.5

Present the information in the form of a pie chart.

Answer

Here, total workers = 100 %

So,

The central angle = $\frac{Component\ value}{100} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Category	Percentage of workers	Sector angle (degree)
Cultivators	40	40/100 × 360 = 144
Agricultural laborers	25	25/100 × 360 = 90
Industrial workers	12.5	12.5/100 × 360 = 45
Commercial workers	10	10/100 × 360 = 36
Others	12.5	12.5/100 × 360 = 45

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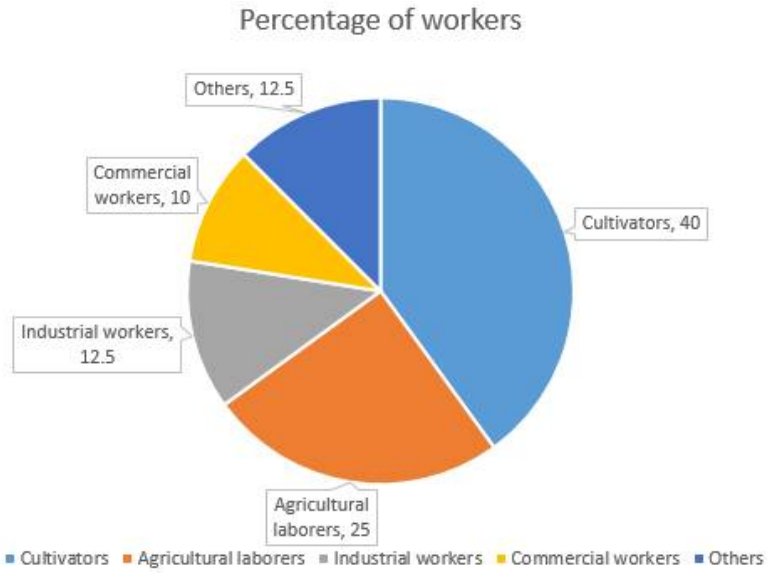

6. Question

The following table shows the expenditure incurred by a publisher in publishing a book :

Present the above data in the form of piechart.

Items	Paper	Printing	Binding	Advertising	Miscellaneous
Expenditure %	35%	20%	10%	5%	30%

Answer

Here, total expenditure = 100 %

So,

The central angle = $\frac{Component\ value}{100} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in %)	Sector angle (degree)
Paper	35	35/100 × 360 = 126
Printing	20	20/100 × 360 = 72
Binding	10	10/100 × 360 = 36
Advertising	5	5/100 × 360 = 18
Miscellaneous	30	30/100 × 360 = 108

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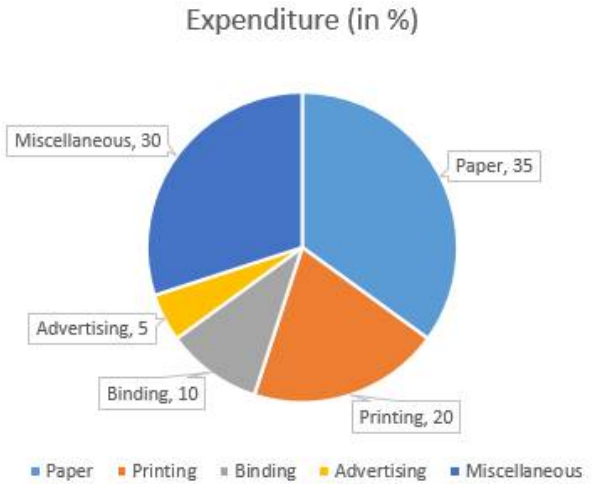

7. Question

Percentage of the different products of a village in a particular district are given below. Draw a pie chart representing this information.

Items	Wheat	Pulses	Jwar	Ground Nuts	Vegetables	Total
%	$\frac{125}{3}$	$\frac{125}{6}$	$\frac{25}{2}$	$\frac{50}{3}$	$\frac{25}{3}$	100

Answer

Here, total product percentage = 100 %

So,

The central angle = $\frac{Component\ value}{100} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	In %	Sector angle (degree)
Wheat	125/3	$\frac{125}{3}/100 \times 360 = 150$
Pulses	125/6	$\frac{125}{6}/100 \times 360 = 75$
Jwar	25/2	$\frac{25}{2}/100 \times 360 = 45$
Groundnuts	50/3	$\frac{50}{3}/100 \times 360 = 60$
Vegetables	25/3	$\frac{25}{3}/100 \times 360 = 30$

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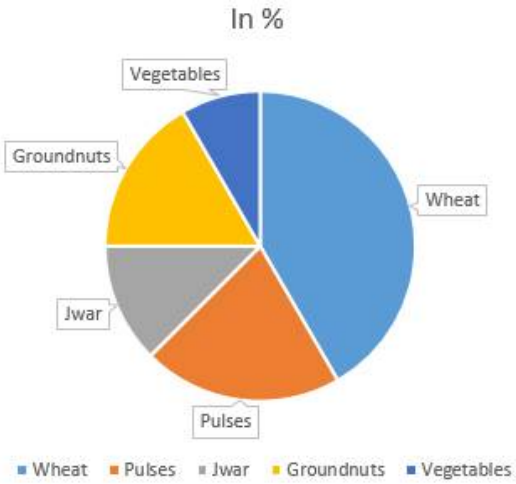

8. Question

Draw a pie diagram for the following data of expenditure pattern in a family :

Items	Food	Clothing	Rent	Education	Unforeseen Events	Medicine
Expenditure (in %)	40%	20%	10%	10%	15%	5%

Answer

Here, total expenditure = 100 %

So,

The central angle = $\frac{Component\ value}{100}$ × 360°

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure	Sector angle (degree)
Food	40%	40/100 × 360 = 144
Clothing	20%	20/100 × 360 = 72
Rent	10%	10/100 × 360 = 36
Education	10%	10/100 × 360 = 36
Unforeseen events	15%	15/100 × 360 = 54
Medicine	5%	5/100 × 360 = 18

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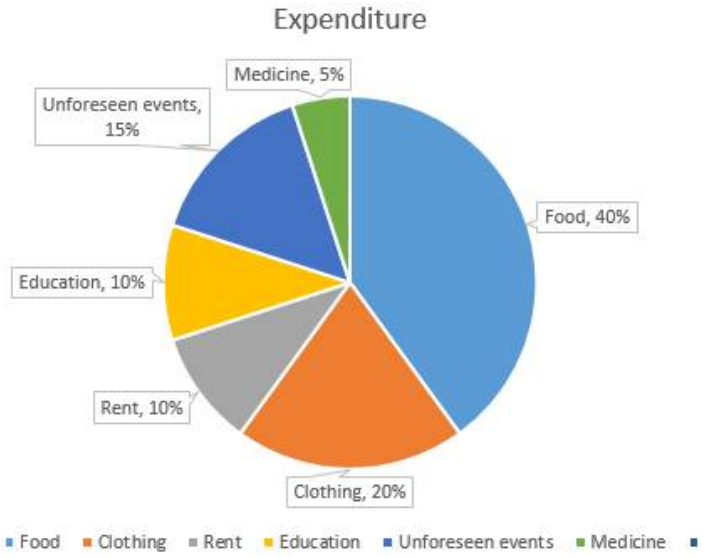

9. Question

Draw a pie diagram of the areas of continents of the world given in the following table :

Continents	Asia	U.S.S.R	Africa	Europe	North America	South America	Australia
Area (in million Sq. km)	26.9	20.5	30.3	4.9	24.3	17.9	8.5

Answer

Here, total area = 133.3 million km2

So,

The central angle = $\frac{Component\ value}{133.3} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Continent	Area (in million sq. km)	Sector angle (degree)
Asia	26.9	26.9/133.3 × 360 = 72.6
U.S.S.R	20.5	20.5/133.3 × 360 = 55.4
Africa	30.3	30.3/133.3 × 360 = 81.8
Europe	4.9	4.9/133.3 × 360 = 13.2
North America	24.3	24.3/133.3 × 360 = 65.6
South America	17.9	17.9/133.3 × 360 = 48.3
Australia	8.5	8.5/133.3 × 360 = 23

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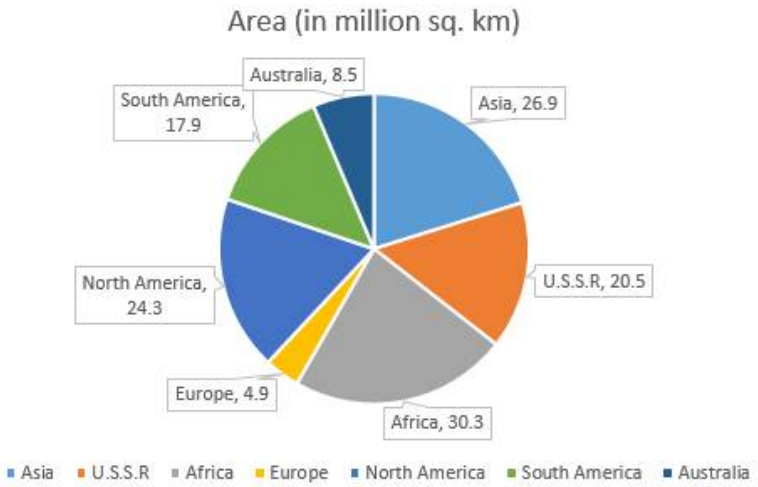

10. Question

The following data gives the amount spent on the construction of a house. Draw a pie diagram

Items	Cement	Timber	Bricks	Labour	Steel	Miscellaneous
Expenditure (in thousand Rs.)	60	30	45	75	45	45

Answer

Here, total expenditure = 300 thousand rupees

So,

The central angle = $\frac{Component\ value}{300} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in thousand Rs)	Sector angle (degree)
Cement	60	60/300 × 360 = 72
Timber	30	30/300 × 360 = 36
Bricks	45	45/300 × 360 = 54
Labour	75	75/300 × 360 = 90
Steel	45	45/300 × 360 = 54
Miscellaneous	45	45/300 × 360 = 54

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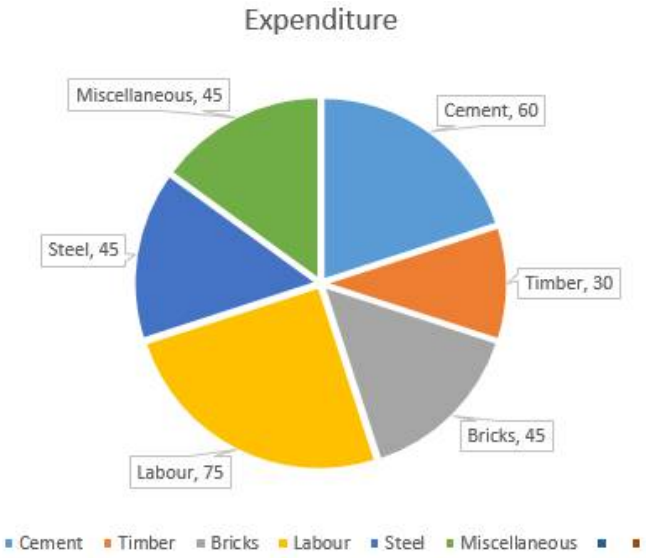

11. Question

The following table shows how a student spends his pocket money during the course of a month. Represent it by a pie diagram.

Items	Food	Entertainment	Other Expenditure	Savings
Expenditure	40%	25%	20%	15%

Answer

Here, total expenditure = 100 %

So,

The central angle = $\frac{Component\ value}{100} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in %)	Sector angle (degree)s
Food	40	40/100 × 360 = 144
Entertainment	25	25/100 × 360 = 90
Other expenditures	20	20/100 × 360 = 72
Savings	15	15/100 × 360 = 54

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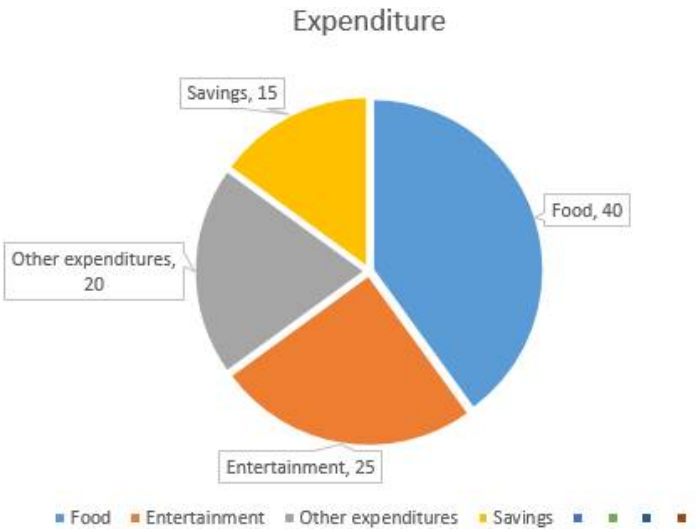

12. Question

Represent the following data by a pie diagram:

Items of expenditure	Expenditure	
	Family A	Family B
Food	4000	6400
Clothing	2500	480
Rent	1500	3200
Education	400	1000
Miscellaneous	1600	600
Total	10000	11680

Answer

Here the total expenditure of family A = 10000 and family B = 11680

So,

The central angle for family A = $\frac{Component\ value}{10000} \times 360°$

The central angle for family B = $\frac{Component\ value}{11680} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (Family A)	Sector angle (degree) (Family A)	Expenditure (Family B)	Sector angle (degree) (Family B)
Food	4000	4000/10000 × 360 = 144	6400	6400/11680 × 360 = 197.3
Clothing	2500	2500/10000 × 360 = 90	480	480/11680 × 360 = 14.8
Rent	1500	1500/10000 × 360 = 54	3200	3200/11680 × 360 = 98.6
Education	400	400/10000 × 360 = 14.4	1000	1000/11680 × 360 = 30.8
Miscellaneous	1600	1600/10000 × 360 = 57.6	600	600/11680 × 360 = 18.5

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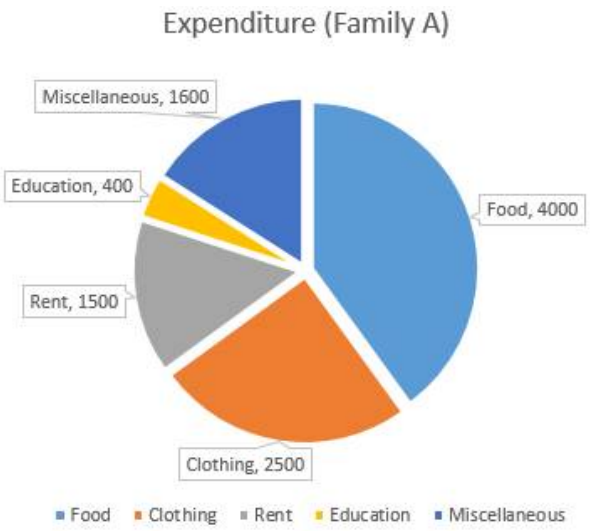

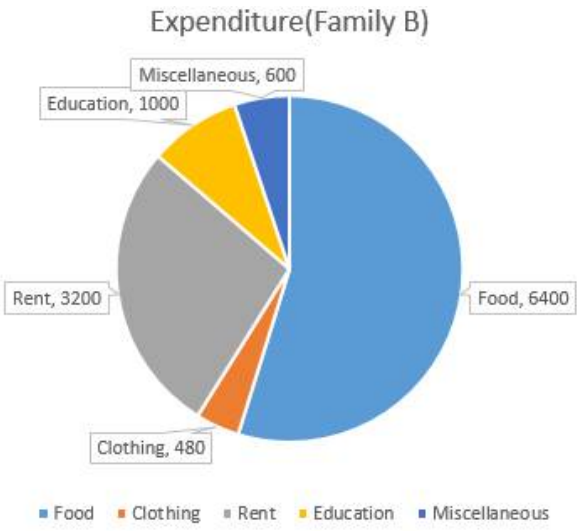

13. Question

Following data gives the break up of the cost of production of a book :

Printing	Paper	Binding Charges	Advertisement	Royalty	Miscellaneous
30%	15%	15%	20%	10%	15%

Draw a pie diagram depicting the above information.

Answer

Here, total cost of production of book = 105 %

So,

The central angle = $\frac{Component\ value}{105} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure	Sector angle (degree)
Printing	30	30/105 × 360 = 102.9
Paper	15	15/105 × 360 = 51.4
Binding charges	15	15/105 × 360 = 51.4
Advertisement	20	20/105 × 360 = 68.6
Royalty	10	10/105 × 360 = 34.3
Miscellaneous	15	15/105 × 360 = 51.4

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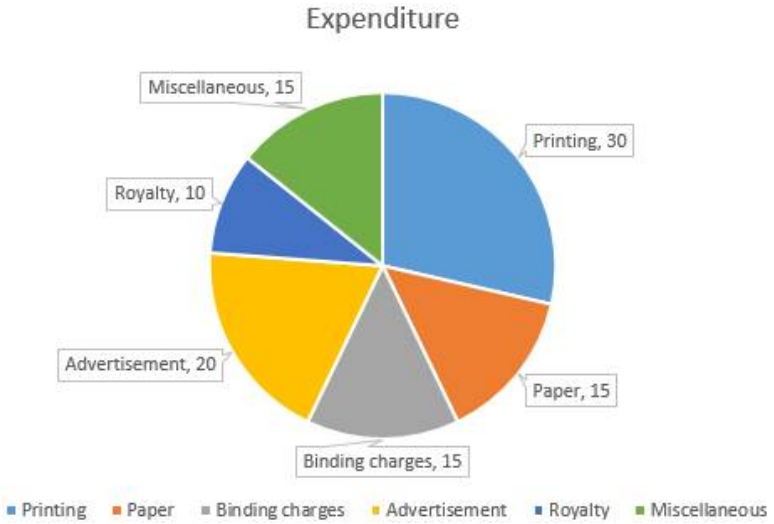

14. Question

Represent the following data with the help of pie diagram :

Items	Wheat	Rice	Tea
Production (in metric Tons)	3260	1840	900

Answer

Here, total production = 6000 metric tons

So,

The central angle = $\frac{Component\ value}{6000} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Production (in metric tons)	Sector angle (degree)
Wheat	3260	3260/6000 x 360 = 195.6
Rice	1840	1840/6000 x 360 =110.4
Tea	900	900/6000 x 360 = 54

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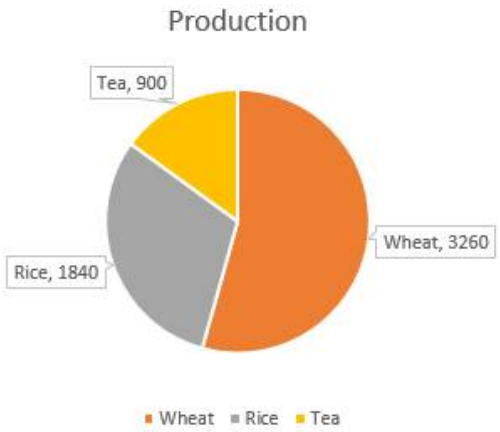

15. Question

Draw a pie-diagram representing the relative frequencies (expressed as percentage) of the eight classes as given below :

12.6, 18.2, 17.5, 20.3, 2.8, 4.2, 9.8, 14.7

Answer

Here, total amount = 100.1%

The central angle = $\frac{Component\ value}{100.1} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Class	Amount (in %)	Sector angle (degree)
1	12.6	12.6/100.1 × 360 = 45.3
2	18.2	18.2/100.1 × 360 = 65.5
3	17.5	17.5/100.1 × 360 = 62.9
4	20.3	20.3/100.1 × 360 = 73
5	2.8	2.8/100.1 × 360 = 10.1
6	4.2	4.2/100.1 × 360 = 15.1
7	9.8	9.8/100.1 × 360 = 35.2
8	14.7	14.7/100.1 × 360 = 52.9

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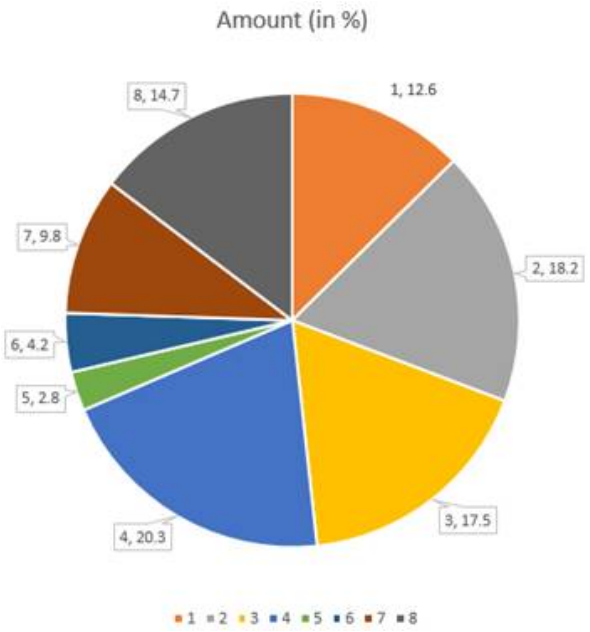

16. Question

Following is the break up of the expenditure of a family on different items of consumption :

Items	Food	Clothing	Rent	Education	Fuel Etc.	Medicine	Miscellaneous
Expenditure (in Rs)	1600	200	600	150	100	80	270

Draw a pie diagram to represent the above data.

Answer

Here, total expenditure = 3000 rupees

So,

The central angle = $\frac{Component\ value}{3000} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in Rs)	Sector angle (degree)
Food	1600	1600/3000 × 360 = 192
Clothing	200	200/3000 × 360 = 24
Rent	600	600/3000 × 360 = 72
Education	150	150/3000 × 360 = 18
Fuel etc	100	100/3000 × 360 = 12
Medicine	80	80/3000 × 360 = 9.6
Miscellaneous	270	270/3000 × 360 = 32.4

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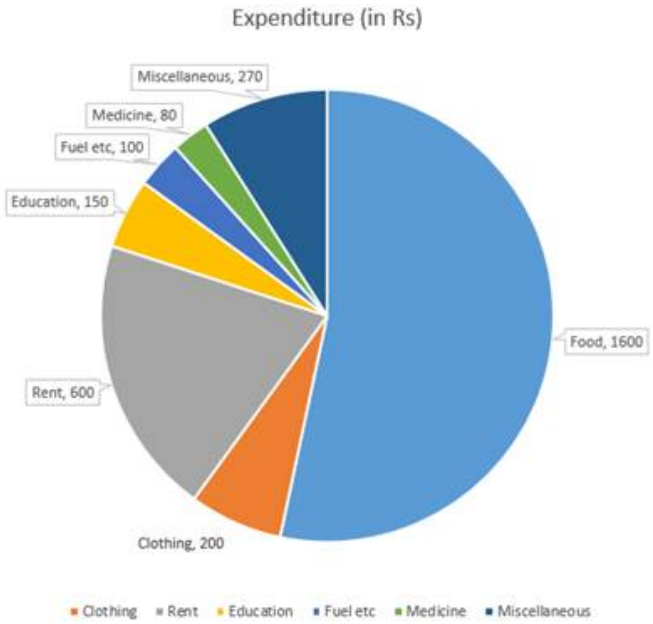

17. Question

Draw a pie diagram for the following data of the investment pattern in a five years plan :

Agriculture	Irrigation & Power	Small Industries	Transport	Social; Service	Miscellaneous
14%	16%	29%	17%	16%	8%

Answer

Here, total investment = 100%

So,

The central angle = $\frac{Component\ value}{100} \times 360°$

Hence, the central angle for each activity will be calculated as follows

Item	Amount	Sector angle (degree)
Agriculture	14	14/100 x 360 = 50.4
Irrigation and Power	16	16/100 x 360 = 57.6
Small Industries	29	29/100 x 360 = 104.4
Transport	17	17/100 x 360 = 61.2
Social Service	16	16/100 x 360 = 57.6
Miscellaneous	8	8/100 x 360 = 28.8

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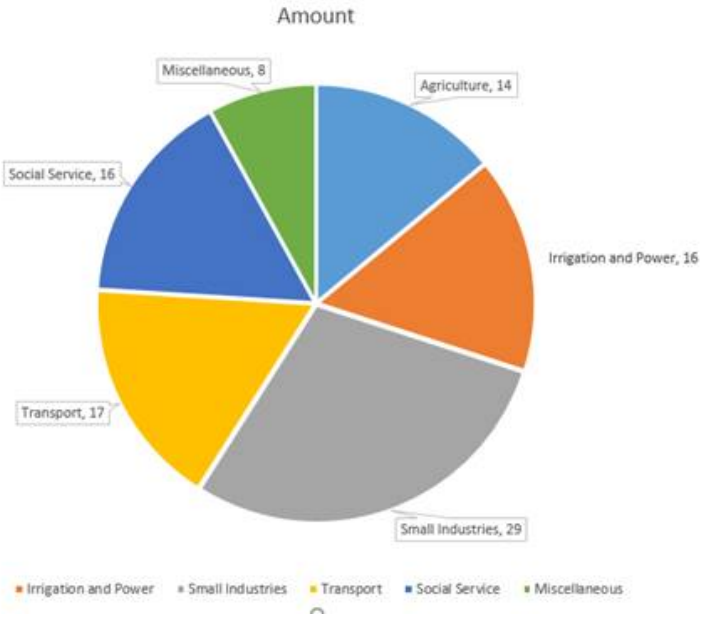

Exercise 25.2

1. Question

The pie chart given in Fig. 25.17 represents the expenditure on different items in constructing a flat in Delhi. If the expenditure incurred on cement is Rs. 112500, find the following

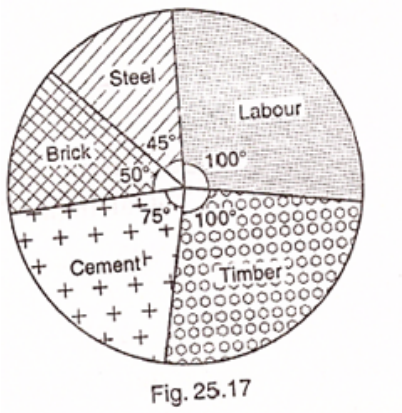

Fig. 25.17

1) Total cost of the flat.

2) Expenditure incurred on labour.

Answer

1) Expenditure incurred on cement = $\frac{\text{Central angle of the sector} \times \text{Total cost}}{360°}$

Total cost of the flat = $\frac{360° \times 112500}{75°}$ = 540000 rupees

2) Expenditure incurred on labor = $\frac{\text{Central angle of the sector} \times \text{Total cost}}{360°} = \frac{100° \times 540000}{360°}$ = 150000 rupees

2. Question

The pie-chart given in Fig. 25.18 shows the annual agricultural production of an Indian state. If the total production of all the commodities is 81000 tonnes, find the production (in tonnes) of

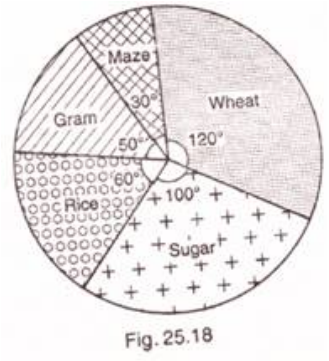

Fig. 25.18

(i) Wheat (ii) Sugar (iii)Rice (iv)Maize (v)Gram

Answer

∵ Total Production = 81000 Tonnes.

1) Production of wheat = $\frac{\text{Central angle for wheat} \times \text{Total production}}{360^\circ} = \frac{120^\circ \times 81000}{360^\circ} = 27000 \text{ tonnes}$

2) Production of sugar = $\frac{\text{Central angle for sugar} \times \text{Total production}}{360^\circ} = \frac{100^\circ \times 81000}{360^\circ} = 22500 \text{ tonnes}$

3) Production of rice = $\frac{\text{Central angle for Rice} \times \text{Total production}}{360^\circ} = \frac{60^\circ \times 81000}{360^\circ} = 13500 \text{ tonnes}$

4) Production of maize = $\frac{\text{Central angle for maize} \times \text{Total production}}{360^\circ} = \frac{30^\circ \times 81000}{360^\circ} = 6750 \text{ tonnes}$

5) Production of rice = $\frac{\text{Central angle for gram} \times \text{Total production}}{360^\circ} = \frac{50^\circ \times 81000}{360^\circ} = 11250 \text{ tonnes}$

3. Question

The following pie chart shows the number of students admitted in different faculties of a college. If 1000 students are admitted in Science answer the following :

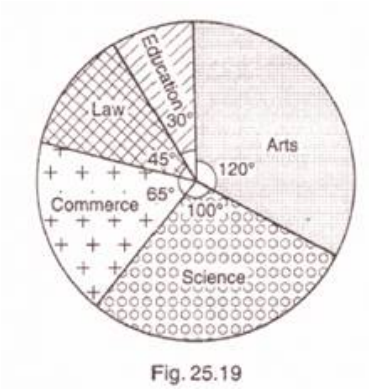

Fig. 25.19

(i) What is the total number of students?

(ii) What is the ratio of students in science and arts?

Answer

1) Students in science = $\frac{\text{Central angle of the corresponding sector} \times \text{Total students}}{360^\circ}$

$1000 = \frac{100^\circ \times \text{Total students}}{360^\circ}$

∴ Total students = 3600

2) Students in arts = $\frac{\text{Central angle for arts} \times \text{Total students}}{360^\circ} = \frac{120^\circ \times 3600}{360^\circ} = 1200$

∴ Ratio of students in science and arts = 1000:1200 = 5:6

4. Question

In Fig. 25.20, the pie-chart shows the marks obtained by a student in an examination. If the student secures 440 marks in all, calculate his marks in each of the given subjects.

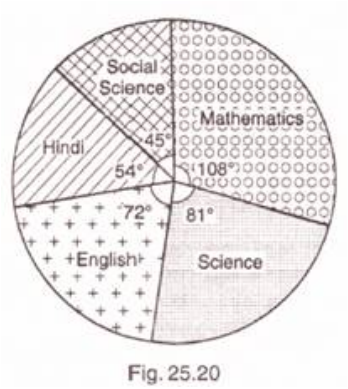

Fig. 25.20

Answer

Marks secured in mathematics = $\frac{108 \times 440}{360}$marks = 132 marks

Marks secured in science =$\frac{81 \times 440}{360}$ marks = 99 marks

Marks secured in English = $\frac{72 \times 440}{360}$marks = 88 marks

Marks secured in Hindi = $\frac{54 \times 440}{360}$ marks = 66 marks

Marks secured in social science = $\frac{45 \times 440}{360}$ marks = 55 marks

5. Question

In Fig. 25.21, the pie chart shows the marks obtained by a student in various subjects. If the student scored 135 marks in mathematics, find the total marks in all the subjects. Also, find his score in individual subjects.

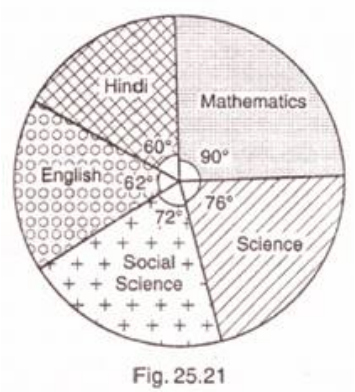

Fig. 25.21

Answer

First we need to find total marks.

So,

Marks scored in mathematics = $\frac{\text{Central angle of sector} \times \text{Total Marks}}{360°}$

135 = $\frac{90° \times \text{Total Marks}}{360°}$

∴ Total Marks = 540

Marks scored in Hindi = $\frac{\text{Central angle of sector} \times \text{Total Marks}}{360°} = \frac{60 \times 540}{360°}$ = 90 marks

Similarly, marks scored in science = $\frac{76 \times 540}{360^\circ}$ marks = 114 marks

Marks scored in social science = $\frac{72 \times 540}{360^\circ}$ marks = 108 marks

Marks scored in English = $\frac{62 \times 540}{360^\circ}$ marks = 93 marks

6. Question

The following pie chart shows the monthly expenditure of Shikha on various items. If she spends Rs. 16000 per month, answer the following questions:

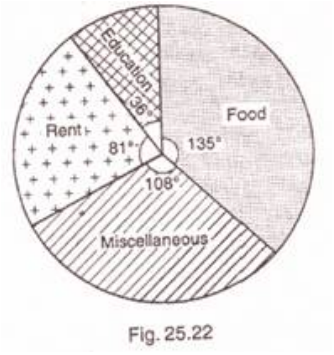

Fig. 25.22

(i) How much does she spend on rent?

(ii) How much does she spend on education?

(iii) What is the ratio of expenses on food and rent?

Answer

1) Money spent on rent = $\frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{81^\circ \times 16000}{360^\circ}$ = 3,600 rupees

2) Money spent on education = $\frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{36^\circ \times 16000}{360^\circ}$ = 1,600 rupees

3) Money spent on food = $\frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{135^\circ \times 16000}{360^\circ}$ = 6000 rupees

Ratio of expenses on food and rent = $\frac{6000}{3600} = \frac{5}{3}$

7. Question

The pie chart (as shown in Fig. 25.23) represents the amount spent on different sports by a sports club in a year. If the total money spent by the club on sports is Rs. 1,08,000, find the amount spent on each sport.

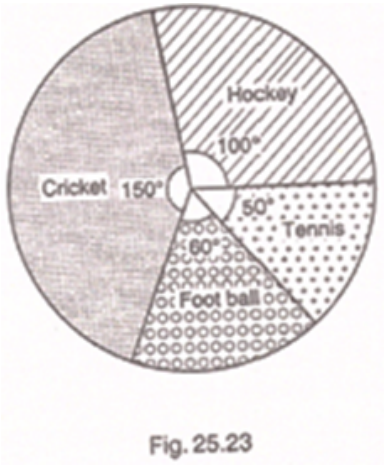

Fig. 25.23

Answer

Money spent on cricket = $\frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360°} = \frac{150° \times 108000}{360°}$ = 45,000 rupees

Money spent on hockey = $\frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360°} = \frac{100° \times 108000}{360°}$ = 30,000 rupees

Money spent on football = $\frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360°} = \frac{60° \times 108000}{360°}$ = 18,000 rupees

Money spent on cricket = $\frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360°} = \frac{50° \times 108000}{360°}$ = 15,000 rupees